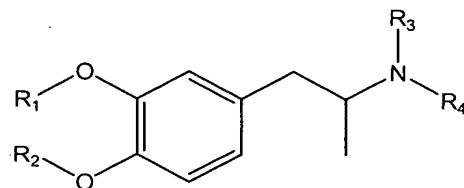


WHAT IS CLAIMED IS:

1. A compound of the formula:



5

Formula I

wherein: R^1 is H, lower alkyl, a protecting group, or is taken together with R^2 to form a ring,

R^2 is H, lower alkyl, a protecting group, $-(CH_2)_nSCH_2C(O)R^6$ or $-(CH_2)_nC(SO_2R^6)=CH_2$, or is taken together with R^1 to form a ring,
10 R^3 and R^4 are independently H or lower alkyl or a protecting group, or, when R^1 is taken together with R^2 to form a ring, at least one of R^3 or R^4 is $-C(O)(CH_2)_nR^5$, $-C(O)(CH_2)_nNHC(O)R^5$, $-C(O)(CH_2)_nNHC(O)(CH_2)_nSR^5$, $-(CH_2)_nC(SO_2R^5)=CH_2$, $-(CH_2)_nSCH_2C(O)R^5$, or $-(CH_2)_nC(SO_2R^5)=CH_2$, or when
15 R^1 is not taken together with R^2 to form a ring, at least one of R^1 and R^2 is not H or lower alkyl or a protecting group,

R^5 is H, -OH, -SH, -O-lower alkyl, halogen, NH₂, -succinimidyl, -maleimidyl, immunogenic carrier, or label,

20 R^6 is H, -OH, -SH, -O-lower alkyl, halogen, NH₂, -succinimidyl, -maleimidyl, immunogenic carrier, or label, and

n is an integer from 1 to 5,

and including acid salts thereof.

2. A compound according to Claim 1 wherein said immunogenic carrier is a
25 poly(amino acid).

3. A compound according to Claim 2 wherein said poly(amino acid) is a protein.

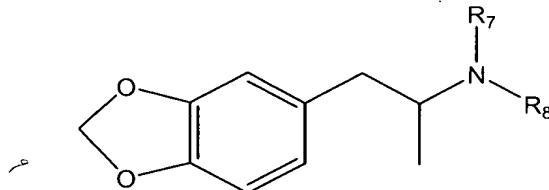
30 4. Antibodies raised against the compound of Claim 3.

5. A compound according to Claim 1 wherein n is 1.

6. A compound according to Claim 1 wherein said label is an enzyme, a luminescer, or a radioisotope.

5

7. A compound of the formula:



Formula II

10 wherein: R⁷ is H, lower alkyl, a protecting group, -C(O)(CH₂)_nR⁵, -C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵, -(CH₂)_nC(SO₂R⁵)=CH₂, -(CH₂)_nSCH₂C(O)R⁵, or -(CH₂)_nC(SO₂R⁵)=CH₂,

R⁸ is H, lower alkyl, a protecting group, -C(O)(CH₂)_nR⁵,

-C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵, -(CH₂)_nC(SO₂R⁵)=CH₂,

15 -(CH₂)_nSCH₂C(O)R⁵, or -(CH₂)_nC(SO₂R⁵)=CH₂,

R⁵ is H, -OH, -SH, -O-lower alkyl, halogen, NH₂, immunogenic carrier, -succinimidyl, -maleimidyl, or label, and

n is an integer from 1 to 5,

with the proviso that at least one of R⁷ and R⁸ are not H or lower alkyl, and

20 and including the acid salts thereof.

8. A compound according to Claim 7 wherein said protein is selected from the group consisting of KLH, BSA, BGG, and ovalbumin.

25 9. Antibodies raised against the compound of Claim 8.

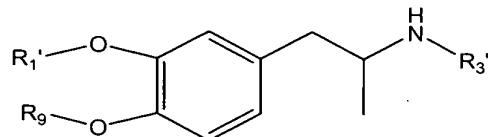
10. A compound according to Claim 7 wherein n is 1.

11. A compound according to Claim 6 wherein R⁷ is H or lower alkyl.

12. A compound according to Claim 7 wherein said label is an enzyme, a luminescer, or a radioisotope.

13. A compound of the formula:

5



wherein: R^{3'} is H, methyl or ethyl or a protecting group,
 R^{1'} is H or lower alkyl or a protecting group,
 R⁹' is a protecting group, -(CH₂)_nSCH₂C(O)R⁶ or -(CH₂)_nC(SO₂R⁶)=CH₂,
 R⁶ is H, -OH, -SH, -O-lower alkyl, halogen, NH₂, immunogenic carrier,
 -succinimidyl, -maleimidyl, or label, and
 n is an integer from 1 to 5,

and including acid salts thereof.

15 14. A compound according to Claim 13 wherein said protein is selected from the group consisting of KLH, BSA, BGG, and ovalbumin.

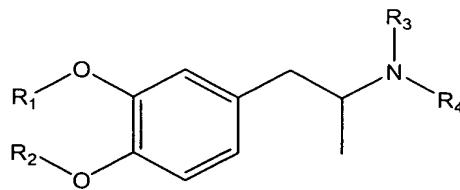
15. Antibodies raised against the compound of Claim 14.

20 16. A compound according to Claim 13 wherein n is 1.

17. A compound according to Claim 13 wherein said label is an enzyme, a luminescer, or a radioisotope.

25 18. A method for determining a compound selected from the group consisting of 3,4-methylenedioxymphetamine (MDA), 3,4-methylenedioxymethamphetamine (MDMA), 3,4-methylenedioxymethylamphetamine (MDEA) and 4-hydroxy-3-methoxy-methamphetamine (HMMA), said method comprising:

- (a) providing in combination in a medium:
 - (i) a sample suspected of containing said compound and
 - (ii) an antibody raised against a compound of the formula:



wherein: R^1 is H, lower alkyl, a protecting group, or is taken together with R^2 to form a ring,

5 R^2 is H, lower alkyl, a protecting group, $-(CH_2)_nSCH_2C(O)R^6$ or $-(CH_2)_nC(SO_2R^6)=CH_2$, or is taken together with R^1 to form a ring,
 R^3 and R^4 are independently H or lower alkyl or a protecting group, or, when R^1 is taken together with R^2 to form a ring, at least one of R^3 or R^4 is $-C(O)(CH_2)_nR^5$, $-C(O)(CH_2)_nNHC(O)R^5$, $-C(O)(CH_2)_nNHC(O)(CH_2)_nSR^5$,
10 $-(CH_2)_nC(SO_2R^5)=CH_2$, $-(CH_2)_nSCH_2C(O)R^5$, or $-(CH_2)_nC(SO_2R^5)=CH_2$, or when R^1 is not taken together with R^2 to form a ring, at least one of R^1 and R^2 is not H or lower alkyl or a protecting group,

R^5 is an immunogenic carrier,

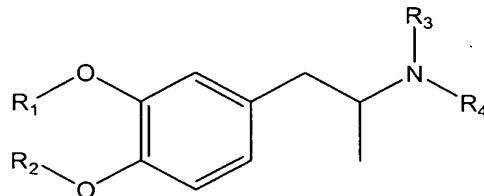
R^6 is an immunogenic carrier, and

15 n is an integer from 1 to 5, and

(b) examining said medium for the presence a complex comprising said compound and said antibody, the presence thereof indicating the presence of said compound in said sample.

20 19. A method according to Claim 18 wherein said combination further comprises:

(iii) a label conjugate of the formula:



25 wherein: R^1 is H, lower alkyl, a protecting group, or is taken together with R^2 to form a ring,

R^2 is H, lower alkyl, a protecting group, $-(CH_2)_nSCH_2C(O)R^6$ or

$-(CH_2)_nC(SO_2R^6)=CH_2$, or is taken together with R¹ to form a ring,

R³ and R⁴ are independently H or lower alkyl or a protecting group, or, when R¹ is taken together with R² to form a ring, at least one of R³ or R⁴ is
 $-C(O)(CH_2)_nR^5$, $-C(O)(CH_2)_nNHC(O)R^5$, $-C(O)(CH_2)_nNHC(O)(CH_2)_nSR^5$,

5 $-(CH_2)_nC(SO_2R^5)=CH_2$, $-(CH_2)_nSCH_2C(O)R^5$, or $-(CH_2)_nC(SO_2R^5)=CH_2$, or when R¹ is not taken together with R² to form a ring, at least one of R¹ and R² is not H or lower alkyl or a protecting group,

R⁵ is a label,

R⁶ is a label, and

10 n is an integer from 1 to 5, and

said examining comprises measuring signal from said label, the amount thereof being related to the presence of said compound in said sample.

20. A method according to Claim 19 wherein said method is a homogeneous
15 method and said medium is examined for the amount of said signal.

21. A method according to Claim 18 wherein said method is a heterogeneous
method and said complex, if present, is separated from said medium.

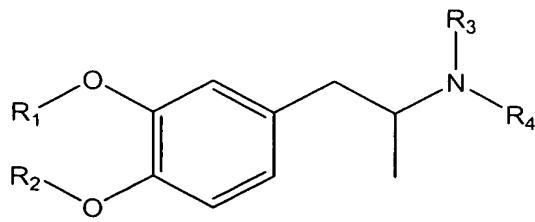
20 22. A method according to Claim 18 wherein said protein is selected from
the group consisting of KLH, BSA, BGG and ovalbumin.

23. A method according to Claim 18 wherein n is 1.

25 24. A method according to Claim 19 wherein said label is an enzyme, a
luminescer, or a radioisotope.

25. A kit for determining a compound selected from the group consisting of
3,4-methylenedioxymphetamine (MDA), 3,4-methylenedioxymethamphetamine
30 (MDMA), 3,4-methylenedioxymethylamphetamine (MDEA) and 4-hydroxy-3-methoxy-
methamphetamine (HMMA), said kit comprising:

(a) an antibody raised against a compound of the formula:

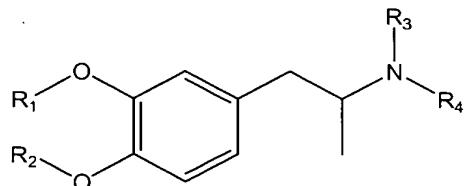


wherein: R¹ is H, lower alkyl, a protecting group, or is taken together with R² to form a ring,

5 R² is H, lower alkyl, a protecting group, -(CH₂)_nSCH₂C(O)R⁶ or -(CH₂)_nC(SO₂R⁶)=CH₂, or is taken together with R¹ to form a ring,
 R³ and R⁴ are independently H or lower alkyl or a protecting group, or, when R¹ is taken together with R² to form a ring, at least one of R³ or R⁴ is -C(O)(CH₂)_nR⁵, -C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵,
 10 -(CH₂)_nC(SO₂R⁵)=CH₂, -(CH₂)_nSCH₂C(O)R⁵, or -(CH₂)_nC(SO₂R⁵)=CH₂, or when R¹ is not taken together with R² to form a ring, at least one of R¹ and R² is not H or lower alkyl or a protecting group,
 R⁵ is an immunogenic carrier,
 R⁶ is an immunogenic carrier, and
 15 n is an integer from 1 to 5, and
 (b) ancillary reagents for determining said compound.

26. A kit for determining a compound selected from the group consisting of 3,4-methylenedioxymethamphetamine (MDA), 3,4-methylenedioxymethamphetamine (MDMA), 3,4-methylenedioxymethylamphetamine (MDEA) and 4-hydroxy-3-methoxymethamphetamine (HMMA), said kit comprising:

(a) an antibody for said compound,
 (b) a label conjugate of the formula:



25 Formula V

wherein: R¹ is H, lower alkyl, a protecting group, or is taken together with R² to

form a ring,

R² is H, lower alkyl, a protecting group, -(CH₂)_nSCH₂C(O)R⁶ or -(CH₂)_nC(SO₂R⁶)=CH₂, or is taken together with R¹ to form a ring,
5 R³ and R⁴ are independently H or lower alkyl or a protecting group, or, when R¹ is taken together with R² to form a ring, at least one of R³ or R⁴ is -C(O)(CH₂)_nR⁵, -C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵, -(CH₂)_nC(SO₂R⁵)=CH₂, -(CH₂)_nSCH₂C(O)R⁵, or -(CH₂)_nC(SO₂R⁵)=CH₂, or when R¹ is not taken together with R² to form a ring, at least one of R¹ and R² is not H or lower alkyl or a protecting group,

10 R⁵ is a label,

R⁶ is a label, and

n is an integer from 1 to 5, and

(c) ancillary reagents for determining said compound.

15 27. A kit according to Claim 25 wherein said protein is selected from the group consisting of KLH, BSA, BGG and ovalbumin.

28. A kit according to Claim 25 wherein n is 1.

20 29. A kit according to Claim 26 wherein said label is an enzyme, a luminescer, or a radioisotope.

30. A method for determining amphetamine and/or methamphetamine and/or methylenedioxymethamphetamine in a sample suspected of containing
25 methylenedioxymethamphetamine and/or methylenedioxymethamphetamine and/or methylenedioxymethamphetamine, said method comprising:

(a) providing in combination in a medium:

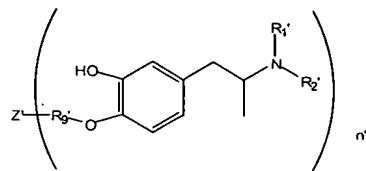
(i) said sample,

(ii) an antibody for methylenedioxymethamphetamine, and/or

30 (iii) an antibody for methylenedioxymethamphetamine, and/or

(iv) an antibody for methylenedioxymethamphetamine, and

(v) a compound of the formula:



wherein:

R^{1'} is H,

R^{2'} is H, or methyl or ethyl,

5 R^{9'} is -(CH₂)_nSCH₂C(O)R^{6'} or -(CH₂)_nC(SO₂R^{6'})=CH₂,

R^{6'} is Z', which is an enzyme,

n' is an integer between 1 and the molecular weight of said enzyme divided by about 500; and

(b) examining said medium for the presence of a complex comprising said
10 methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine, the presence thereof indicating the presence of said methylenedioxymethamphetamine and/or
15 methylenedioxymethamphetamine and/or methylenedioxymethamphetamine in said sample.

31. A method for determining methylenedioxymethamphetamine and/or methylenedioxymethamphetamine and/or methylenedioxymethamphetamine in a sample
20 suspected of containing methylenedioxymethamphetamine and/or methylenedioxymethamphetamine and/or methylenedioxymethamphetamine, said method comprising:

(a) providing in combination in a medium:

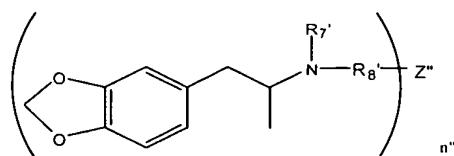
(i) said sample,

25 (ii) an antibody for methylenedioxymethamphetamine, and/or

(iii) an antibody for methylenedioxymethamphetamine, and/or

(iv) an antibody for methylenedioxymethamphetamine, and

(v) a compound of the formula:



wherein:

R^{7'} is H, or methyl, or ethyl,

R^{8'} is -C(O)(CH₂)_nR^{5'}, -C(O)(CH₂)_nNHC(O)R^{5'}, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR^{5'}, -(CH₂)_nC(SO₂R^{5'})=CH₂, -(CH₂)_nSCH₂C(O)R^{5'}, or -(CH₂)_nC(SO₂R^{5'})=CH₂,

5 R^{5'} is Z'', which is an enzyme,

n" is an integer between 1 and the molecular weight of said enzyme divided by about 500; and

(b) examining said medium for the presence of a complex comprising said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or
10 a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine, the presence thereof indicating the presence of said methylenedioxymethamphetamine and/or methylenedioxymethamphetamine and/or methylenedioxymethamphetamine in said
15 sample.

32. A method for determining methylenedioxymethamphetamine and/or methylenedioxymethamphetamine and/or methylenedioxymethamphetamine in a sample suspected of containing methylenedioxymethamphetamine and/or
20 methylenedioxymethamphetamine and/or methylenedioxymethamphetamine, said method comprising:

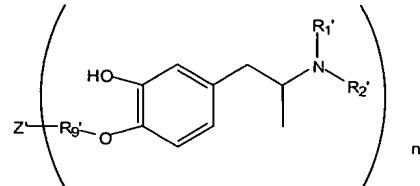
(a) providing in combination in a medium:

(i) said sample,

(ii) a conjugate of an enzyme and a methylenedioxymethamphetamine

25 analog and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog,

(iii) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:

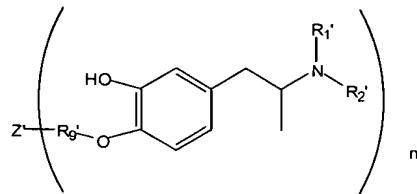


30 wherein:

R¹, is H,
R², is H,
R⁹, is -(CH₂)_nSCH₂C(O)R⁶ or -(CH₂)_nC(SO₂R⁶)=CH₂,
R⁶, is Z', which is an immunogenic protein or a non-poly(amino acid)
5 immunogenic carrier,

n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and/or

(iv) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



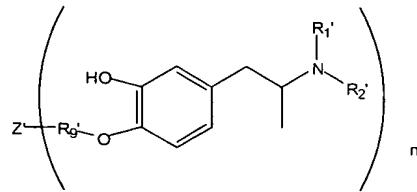
10

wherein:

R¹, is H,
R², is methyl,
R⁹, is -(CH₂)_nSCH₂C(O)R⁶ or -(CH₂)_nC(SO₂R⁶)=CH₂,
15 R⁶, is Z', which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and/or

(v) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



wherein:

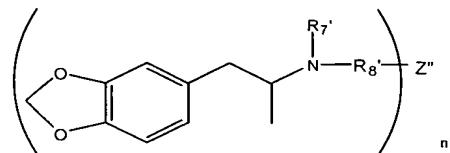
R¹, is H,
R², is ethyl,
25 R⁹, is -(CH₂)_nSCH₂C(O)R⁶ or -(CH₂)_nC(SO₂R⁶)=CH₂,
R⁶, is Z', which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and

(b) examining said medium for the presence of a complex comprising said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or
 5 a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine, the presence thereof indicating the presence of said methylenedioxymethamphetamine and/or methylenedioxymethamphetamine and/or methylenedioxymethamphetamine in said
 10 sample.

33. A method for determining methylenedioxymethamphetamine and/or methylenedioxymethamphetamine in a sample suspected of containing methylenedioxymethamphetamine and/or methylenedioxymethamphetamine, said method comprising:

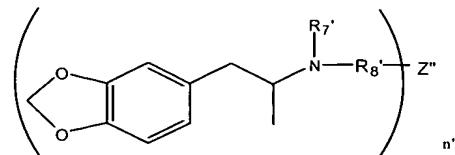
(a) providing in combination in a medium:
 (i) said sample,
 (ii) a conjugate of an enzyme and a methylenedioxymethamphetamine analog and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog
 20 and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog,
 (iii) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



wherein:

25 R⁷ is H,
 R⁸ is -C(O)(CH₂)_nR⁵, -C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵,
 -(CH₂)_nC(SO₂R⁵)=CH₂, -(CH₂)_nSCH₂C(O)R⁵ or -(CH₂)_nC(SO₂R⁵)=CH₂,
 R⁵ is Z'', which is an immunogenic protein or a non-poly(amino acid)
 immunogenic carrier,
 30 n'' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and/or

(iv) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



wherein:

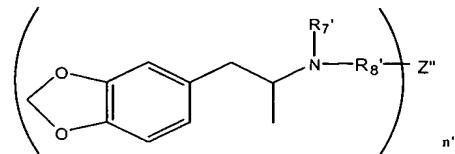
5 R⁷ is methyl,

R⁸ is -C(O)(CH₂)_nR⁵, -C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵, -(CH₂)_nC(SO₂R⁵)=CH₂, -(CH₂)_nSCH₂C(O)R⁵ or -(CH₂)_nC(SO₂R⁵)=CH₂,

R⁵ is Z'', which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

10 n'' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and/or

(v) an antibody for methylenedioxyamphetamine, said antibody being raised against a compound of the formula:



15 wherein:

R⁷ is ethyl,

R⁸ is -C(O)(CH₂)_nR⁵, -C(O)(CH₂)_nNHC(O)R⁵, -C(O)(CH₂)_nNHC(O)(CH₂)_nSR⁵, -(CH₂)_nC(SO₂R⁵)=CH₂, -(CH₂)_nSCH₂C(O)R⁵ or -(CH₂)_nC(SO₂R⁵)=CH₂,

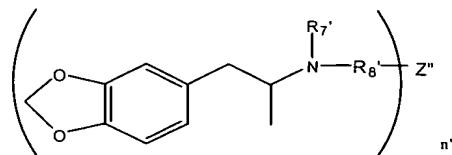
20 R⁵ is Z'', which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n'' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and

(b) examining said medium for the presence of a complex comprising said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or
25 a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine and/or a complex of said methylenedioxymethamphetamine and said antibody for methylenedioxymethamphetamine, the presence thereof indicating the presence of said amphetamine and/or methamphetamine and/or methylenedioxymethamphetamine in said sample.

34. A kit comprising in packaged combination:

- (i) an antibody for methylenedioxymphetamine, and/or
- (ii) an antibody for methylenedioxymethamphetamine, and/or
- 5 (iii) an antibody for methylenedioxymethamphetamine, and
- (iv) a compound of the formula:



wherein:

$R^{7''}$ is H, or methyl, or ethyl,

10 $R^{8''}$ is $-C(O)(CH_2)_nR^{5''}$, $-C(O)(CH_2)_nNHC(O)R^{5''}$, $-C(O)(CH_2)_nNHC(O)(CH_2)_nSR^{5''}$,
 $-(CH_2)_nC(SO_2R^{5''})=CH_2$, $-(CH_2)_nSCH_2C(O)R^{5''}$ or $-(CH_2)_nC(SO_2R^{5''})=CH_2$,

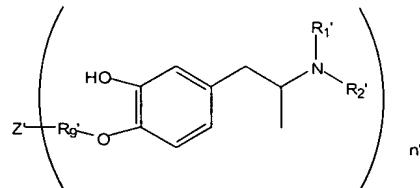
$R^{5''}$ is Z'' , which is an enzyme,

n'' is an integer between 1 and the molecular weight of said enzyme divided by about 500.

15

35. A kit comprising in packaged combination:

- (i) an antibody for methylenedioxymphetamine,
- (ii) an antibody for methylenedioxymethamphetamine, and/or
- (iii) an antibody for methylenedioxymethamphetamine, and
- 20 (iv) a compound of the formula:



wherein:

$R^{1'}$ is H,

25 $R^{2'}$ is H, or methyl or ethyl,

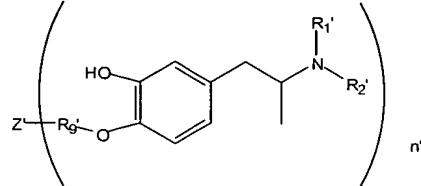
$R^{9''}$ is $-(CH_2)_nSCH_2C(O)R^{6''}$ or $-(CH_2)_nC(SO_2R^{6''})=CH_2$,

$R^{6''}$ is Z' , which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500.

36. A kit comprising in packaged combination:

5 (i) a conjugate of an enzyme and a methylenedioxymethamphetamine analog and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog, and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog, and
(ii) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



10

wherein:

R^{1'} is H,

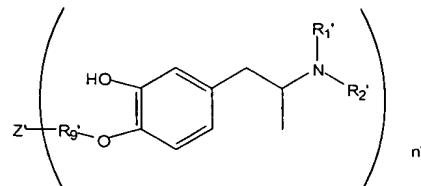
R^{2'} is H,

R^{9'} is -(CH₂)_nSCH₂C(O)R^{6''} or -(CH₂)_nC(SO₂R^{6''})=CH₂,

15 R^{6''} is Z', which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and/or

(iii) an antibody for methylenedioxymethamphetamine, said antibody 20 being raised against a compound of the formula:



wherein:

R^{1'} is H,

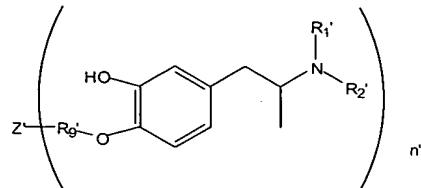
R^{2'} is methyl,

25 R^{9'} is -(CH₂)_nSCH₂C(O)R^{6''} or -(CH₂)_nC(SO₂R^{6''})=CH₂,

R^{6''} is Z', which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500, and/or

(iv) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



5

wherein:

$\text{R}^{1'}$ is H,

$\text{R}^{2'}$ is ethyl,

R^9 is $-(\text{CH}_2)_n\text{SCH}_2\text{C}(\text{O})\text{R}^6$ or $-(\text{CH}_2)_n\text{C}(\text{SO}_2\text{R}^6)=\text{CH}_2$,

10 R^6 is Z' , which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

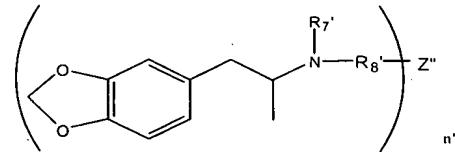
n' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500.

15 37. A kit comprising in packaged combination:

(i) a conjugate of an enzyme and a methylenedioxymethamphetamine analog and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog, and/or a conjugate of an enzyme and a methylenedioxymethamphetamine analog, and

(ii) an antibody for methylenedioxymethamphetamine, said antibody

20 being raised against a compound of the formula:



wherein:

$\text{R}^{7'}$ is H,

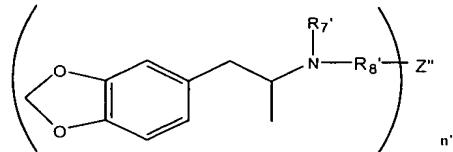
$\text{R}^{8'}$ is $-\text{C}(\text{O})(\text{CH}_2)_n\text{R}^5$, $-\text{C}(\text{O})(\text{CH}_2)_n\text{NHC}(\text{O})\text{R}^5$, $-\text{C}(\text{O})(\text{CH}_2)_n\text{NHC}(\text{O})(\text{CH}_2)_n\text{SR}^5$,

25 $-(\text{CH}_2)_n\text{C}(\text{SO}_2\text{R}^5)=\text{CH}_2$, $-(\text{CH}_2)_n\text{SCH}_2\text{C}(\text{O})\text{R}^5$ or $-(\text{CH}_2)_n\text{C}(\text{SO}_2\text{R}^5)=\text{CH}_2$,

R^5 is Z'' , which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n'' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500; and/or

(iii) an antibody for methylenedioxymethamphetamine, said antibody being raised against a compound of the formula:



5

wherein:

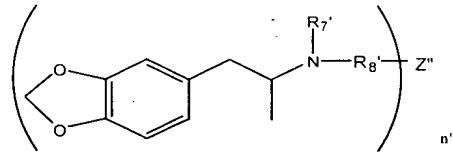
$R^{7'}$ is methyl,

$R^{8'}$ is $-C(O)(CH_2)_nR^{5'}$, $-C(O)(CH_2)_nNHC(O)R^{5'}$, $-C(O)(CH_2)_nNHC(O)(CH_2)_nSR^{5'}$, $-(CH_2)_nC(SO_2R^{5'})=CH_2$, $-(CH_2)_nSCH_2C(O)R^{5'}$ or $-(CH_2)_nC(SO_2R^{5'})=CH_2$,

10 $R^{5'}$ is Z'' , which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n'' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500, and/or

(iv) an antibody for methylenedioxyethamphetamine, said antibody 15 being raised against a compound of the formula:



wherein:

$R^{7'}$ is ethyl,

$R^{8'}$ is $-C(O)(CH_2)_nR^{5'}$, $-C(O)(CH_2)_nNHC(O)R^{5'}$, $-C(O)(CH_2)_nNHC(O)(CH_2)_nSR^{5'}$, 20 $-(CH_2)_nC(SO_2R^{5'})=CH_2$, $-(CH_2)_nSCH_2C(O)R^{5'}$ or $-(CH_2)_nC(SO_2R^{5'})=CH_2$,

$R^{5'}$ is Z'' , which is an immunogenic protein or a non-poly(amino acid) immunogenic carrier,

n'' is an integer between 1 and the molecular weight of said immunogenic protein or said immunogenic carrier divided by about 500.

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